

## CHAPTER 5

# EARTHWORK TRAINING AND QUALIFICATION PROGRAM

### 5.1 PURPOSE

The purpose of the *Earthwork* (~~EARTHWORK~~) *Training and Qualification Program* is to set a specific level of knowledge and physical skills for the persons responsible for the inspection of embankment, subgrade, backfill, and granular base material on Florida Department of Transportation (FDOT) highway and bridge construction projects.

### 5.2 AUTHORITY

Part 23, Section 637, Code of Federal Regulations, Quality Assurance Procedures for Construction

Part 150, Section 10, Code of Federal Regulations, Exemptions and Continued Regulatory Authority in Agreement States (Promulgated under authority of United States Nuclear Regulatory Commission)

Sections ~~334.044(2), and 334.048~~ 20.23(4)(a), and 404.061 and 334.048(3), -Florida Statutes (F.S.)

Section 6, ~~and 105~~ -Florida Department of Transportation ( FDOT ) ~~Standard~~ Specifications for Road and Bridge Construction

### 5.3 QUALIFICATIONS

There are two levels of Earthwork qualifications: Level I and Level II.

#### 5.3.1 Earthwork Level I Qualification Requirements

A qualified EARTHWORK Level I -Technician will safely and effectively sample soil materials from the roadway, take earthwork density readings and record those findings on the *Density Data Forms*. The qualification requirements for

Earthwork Level I are designed to be completed by a newly hired employee with minimal guidance.

There are ~~three~~ three (3) requirements for Earthwork Level I qualification:

~~(1) Hold a valid nuclear radiation safety certificate. Department employees who have completed course ST-06-0001 satisfy this requirement. Should the trainee's nuclear safety course certificate expire during the EARTHWORK Level I qualification, the EARTHWORK Level I qualification shall remain in effect.~~

~~Applicant must certify that they meet/don't meet this requirement on the application.~~

(2) Hold a valid nuclear radiation safety certificate. Department employees who have completed ~~Insert course name~~ the Safety and Control Equipment with Radioactive Materials Course (ST-06-0001) satisfy this requirement.

Applicant must certify that they meet/don't meet this requirement on the application.

~~Pass the EARTHWORK Level I written examination.~~

(23) Pass the Earthwork Level I written examination.

(3) Pass the Earthwork Level I proficiency examination..

~~Pass the EARTHWORK Level I proficiency examination.~~

~~(3) Must have 30 days work experience on a construction project involving earthwork operations. Yvonne, said this is not a requirement for other level 1 courses. Should remove.~~

After a trainee meets all of these qualification requirements, the trainee's FDOT qualification date will be added to the training database. The date of qualification shall be the date the last qualification requirement was satisfied. Qualification shall be for five (5) years (60 months).

### 5.3.1.1 Earthwork Level I Training Course

A one and one half day training course is offered for Level I. Topics covered in this course are included in **Attachment 5-31**.

At the beginning of the second day, a written examination (usually multiple choice) is administered. The proficiency examination is administered on the second day.

Training course attendance is encouraged, but is not required for qualification.

Information about course schedules and costs may be obtained by accessing the [Construction Training Qualification Program \(CTQP\)](http://www.ctqpfloida.com) website <http://www.ctqpfloida.com>. Persons not having access to the CTQP web-site may obtain course schedules by contacting the CTQP [Administrator](#), the District Construction Training Administrator (DCTA), or the State Construction Training Administrator (SCTA).

#### ~~5.3.1.1.1 EARTHWORK Level I Course Prerequisites~~

~~There is only one prerequisite for the EARTHWORK Level I course: Hold a valid nuclear radiation safety certificate. Department employees who have completed course ST-06-0001 satisfy this requirement. Applicant must certify that they meet/don't meet this requirement on the application.~~

~~——— Hold a valid nuclear radiation safety certificate. Department employees who have completed **ST-06-0001** satisfy this requirement. Non-Department personnel, who hold a valid qualification/certification, must submit a copy of the certificate along with the CTQP application. Should the Technician's nuclear safety course certificate expire during the (60 month) qualification period, the EARTHWORK Level I and Level II qualification also expire unless the Technician's safety course certificate is renewed.~~

~~——— Department personnel and Non-department personnel doing business with the Department will submit their valid certificate qualification/license to operate, transport, or handle portable nuclear moisture/density gauges (gauges) per the requirements of Radiation Safety Manual, Topic 675-050-001, State Materials Office. The Non-department personnel can receive this training from the suggested companies as listed on FDOT Construction web site at the following link:~~

### 5.3.1.1.21 Earthwork Level I Written Examination

A written examination (usually 1 hour, multiple choice) is administered at the beginning of the second day of the Earthwork Level I qualification course. The passing score for this examination is 70%.

The written examinations are electronically graded by the CTQP and posted in the [Training Qualification Data Base \(TQDBS\)](#). Two weeks should be allowed for grading and posting of the examination results.

### 5.3.1.1.32 Earthwork Level I Proficiency Examination

A trainee must demonstrate proficiency in **Florida Methods (FM)**. ~~Specifically the Earthwork~~ **Density of Soils and Bituminous Concrete Mixtures in Place by Nuclear Method (FM 1-T 238)**, the Determination of Moisture Content by Means of a **Calcium Carbide Gas Pressure Moisture Tester (FM 5-507)**, also known as the **"Speedy Moisture Test"** and report the test results on the density data forms. A checklist is used for each of these areas. The trainee will have two opportunities to successfully demonstrate all items on the checklist for each area. Failure to demonstrate any item on the checklist will fail the student for that try in that area. Two failures in one area will constitute failure of the proficiency examination. Anyone failing the proficiency examination may apply for a future proficiency examination. The application must be completed and appropriate fee paid [to the provider](#).

## 5.3.2 Earthwork Level II Qualification Requirements

The qualification requirements for an Earthwork Level II Technician include knowledge of ~~SpEarthwork~~ [Earthwork Specification](#) requirements, **Standard Indexes** and ~~P~~rocedures related to earthwork construction.

There are three (3) requirements for Earthwork Level II Qualification:

- (1) Pass the Earthwork Level I written examination [and proficiency](#).

- (2) Pass the Earthwork Level II written examination.
- (3) Must have 30 days work experience on a construction project involving earthwork operations.

### **~~5.3.2.1~~ Earthwork Level II Training Course**

A two-day training course is offered for Earthwork Level II. Topics covered in this course are included in ***Attachment 5-42***.

At the end of the second day, a written examination (usually multiple choice) is administered.

Information about course schedules and costs can be obtained by accessing the CTQP web site. Persons not having access to the CTQP web site may access course schedules by contacting the DCTA, SCTA or the CTQP [Administrator](#).

### **~~5.3.2.1.1~~ Earthwork Level II Course Prerequisites**

Prior to attending the Earthwork Level II course, the trainee [employed by the department](#) shall have passed the following FDOT self-study examinations:

- (1) BT-06-0007 Construction Math
- (2) BT-06-0008 Contract Plans Reading
- (3) BT-06-0009 Earthwork Inspection
- (4) BT-06-0020 Subgrade and Base Inspection

It is highly recommended that a person study the ***FDOT Pipe Placement Inspection (BT-06-0014) Self-study Manual*** and take the examination.

Self-study course manuals are available on-line on Construction web-site and also available from the Department's Maps and Publications Office.

### 5.3.2.1.2 Earthwork Level II Written Examination

A closed book, written examination (usually 2 hours, multiple choice) is administered on the last day of the Earthwork Level II qualification course. The passing score for this examination is 70%.

~~Training course attendance is encouraged, but is not required for qualification.~~ All examinations are electronically graded by the CTQP and the results posted in the TQDBS. Two weeks should be allowed for grading and posting the examination results.

## 5.4 QUALIFICATION REQUIREMENTS BY JOB FUNCTION AND IMPLEMENTATION SCHEDULE

Job functions for each earthwork qualification with the scheduled implementation date are contained in ***Attachment 5-53***.

## 5.5 REQUALIFICATION

Due to frequent changes in specifications, materials, and processes, Certificates of Qualification are issued for 60 months. In order to maintain qualification, Technicians' qualifications must be renewed. An application for requalification should begin after 54 months. Extensions past the 60 month qualification expiration date will not be granted. Consult the CTQP website for the requalification fee schedule.

### 5.5.1 ECI Level 1

Applicants with an active Earthwork Level 1 qualification are required to pass the written examination. ~~Applicants who let their qualification expire will be required to pass the EARTHWORK Level I proficiency demonstration and written examination. Should the Technician's nuclear safety course certificate expire during the qualification period, the EARTHWORK Level I qualification expires until the Technician's nuclear safety course certificate is renewed.~~ After the expiration of Earthwork Level I qualifications, the inspector will have to successfully complete all the requirements for Level I (5.3.1) .

### 5.5.12 ECI Level 2

Applicants for Earthwork Level II must pass a written examination for requalification

### 5.5.1 ECI Level 1

~~60 months five (5) years After a trainee has successfully met all of these qualification requirements, the trainee's FDOT qualification date will be added to the training database. All CTQP Qualifications will be issued with an expiration date five (5) years after the earliest date any requirement for a Earthwork specific qualification was fulfilled. Should the Technician's nuclear safety course certificate expire during the five (5) year (60 month) qualification period, the EARTHWORK Level I and Level II qualification also expire unless the Technician's safety course certificate is renewed. After a trainee has successfully met all of these qualification requirements, the trainee's FDOT qualification date will be added to the training database. The date of qualification shall be the date the last qualification requirement was satisfied. Qualification shall be for 5 years (60 months).~~

~~5.5.2 ECI Level 2 Due to frequent changes in specifications, materials, and processes, Certificates of Qualification are issued for 60 months. In order to maintain qualification, Technicians must be requalified. Requalification for EARTHWORK Level I will require the applicant to pass the written examination. Requalification for EARTHWORK Level II will require the applicant to pass a written examination.~~

~~An application for requalification should begin after 54 months. Extensions past the 60 month qualification expiration date will not be granted. Applicants for EARTHWORK Level I requalification who let their qualification expire will be required to pass the EARTHWORK Level I written examination and proficiency demonstration. Applicants for EARTHWORK Level II requalification who let their qualification expire will be required to meet all the EARTHWORK Level II qualification requirements. Consult the CTQP website for the requalification fee schedule.~~

~~Effective January 1, 2006 All CTQP Qualifications will be issued with an expiration date five (5) years after the earliest date any requirement for a spEarthworkfc qualification was fulfilled. Should the Technician's nuclear safety course certificate expire during the five (5) year (60 month) qualification period, the EARTHWORK Level I and Level II qualification also expire unless the Technician's safety course certificate is renewed. After a trainee has successfully met all of these qualification requirements, the trainee's FDOT qualification date will be added to the training database. The date of qualification shall be the date the last qualification requirement was satisfied. Qualification shall be for 5 years (60 months).~~

When an ~~employee~~ inspector's Earthwork Level I qualifications expires before his Earthwork Level II qualifications, the Earthwork Level II ~~employee~~ inspector cannot perform the duties of a Earthwork Level I. After the expiration ~~The of~~

~~Earthwork~~ Earthwork Level II ~~employee qualifications, after his Level II qualifications expires,~~ the inspector will have to successfully complete all the requirements for Level I (5.3.1) and Level II (5.3.2). ~~retake the Level I and Level II courses and pass all examinations~~

⌚

After a trainee has successfully met all of these qualification requirements, the trainee's FDOT qualification date will be added to the training database.



## 5.6 DEPARTMENT RESPONSIBILITIES

The following responsibilities are unique to the earthwork qualification program and are in addition to those found at the end of **Chapter 1** of this **Manual**. Responsibilities for these qualification programs are distributed among the State Construction Office, State Materials Office and Districts. Responsibilities are as follows:

### 5.6.1 TRT Committee

Review and recommend revisions to the manuals, training aids, examinations and qualification procedure.

### 5.6.2 State Construction Training Office

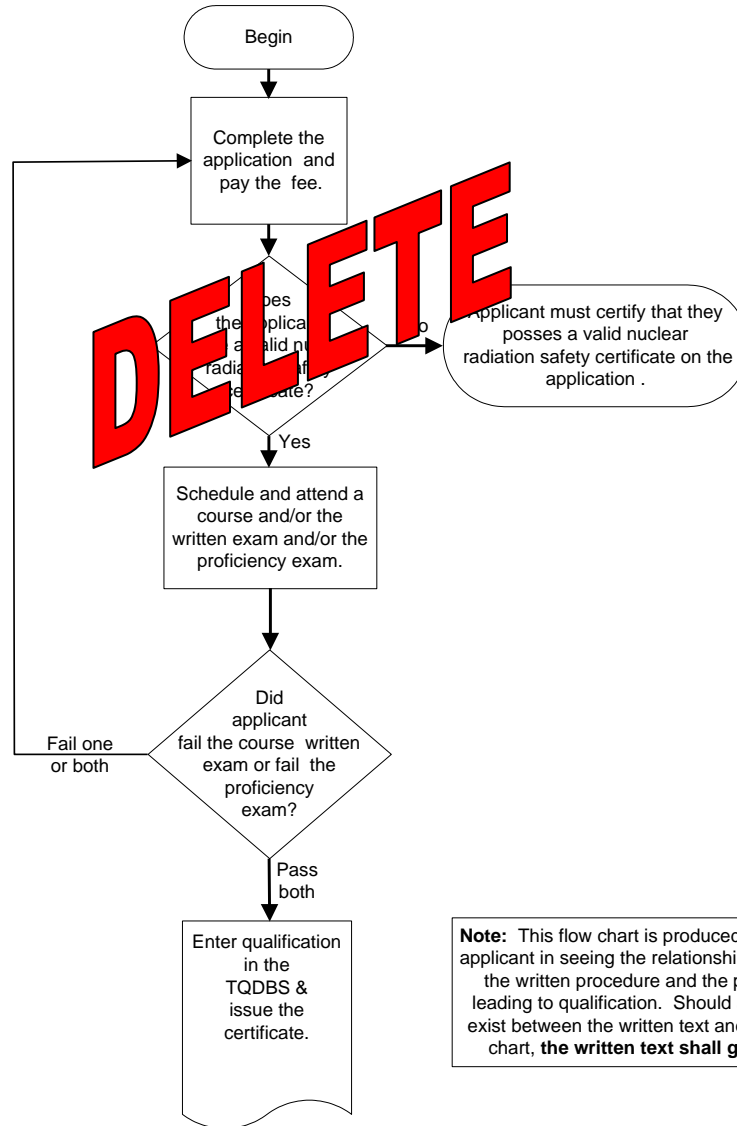
#### **EARTHWORK**

- (1) Coordinate all CTQP related activities with CTQP Administrator, TRT Chairs and Providers.
- (2) Make sure the State Construction Office has representation when requested by the EARTHWORK Committee.

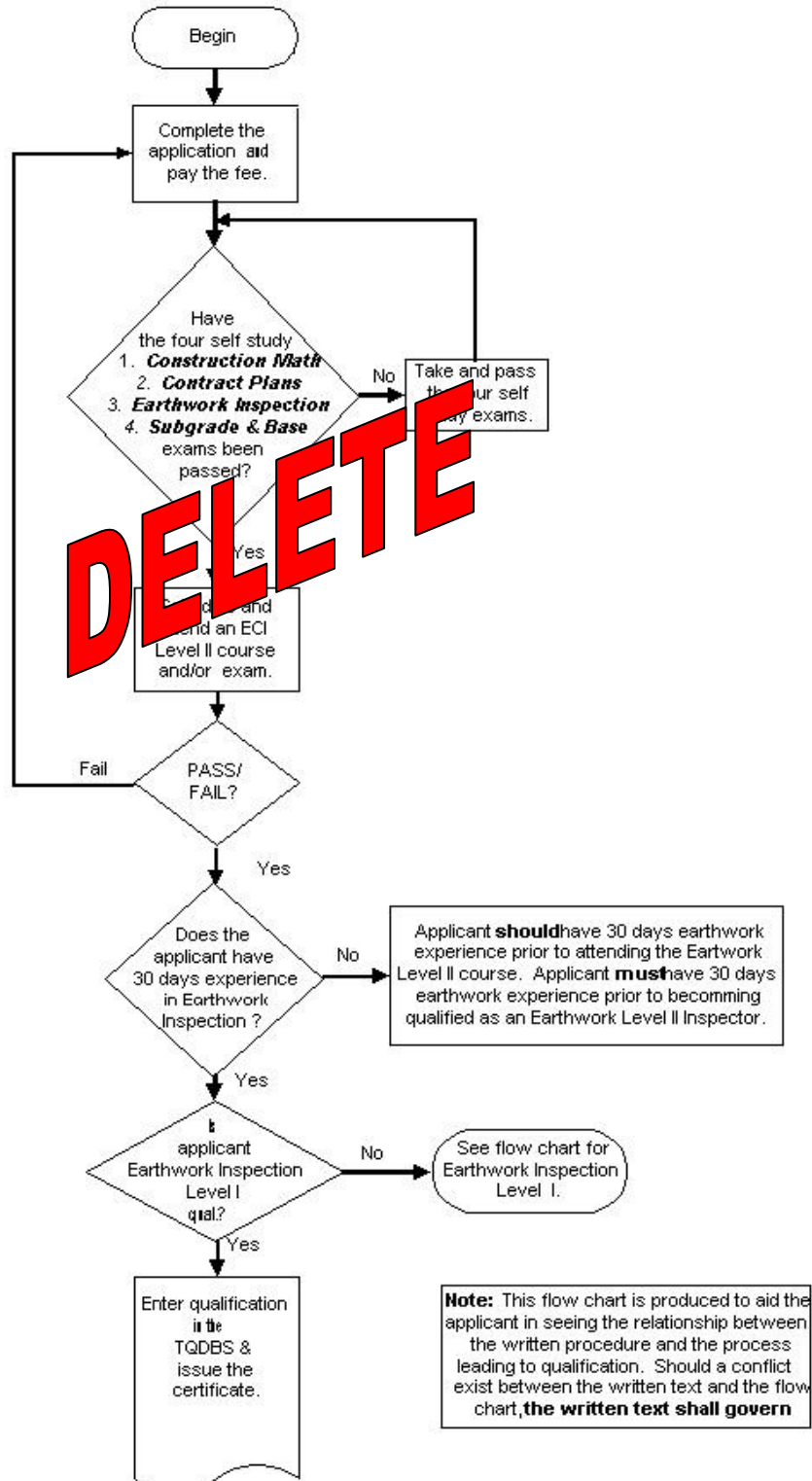
### 5.6.3 State Materials Office

Coordinate the EARTHWORK course with the [Safety and Control of Equipment Course for Equipment With Containing Radioactive Materials \(ST-0617-00013\)](#) <sup>[bww3]</sup> and the **Earthwork Density Record System Course (BT-17-0024)**. The goal for this coordination shall be to ensure that there is a logical and systematic progression of a construction Technician's knowledge and development in the density field. This coordination shall also ensure that there is minimal overlap of the courses.

# EARTHWORK INSPECTION LEVEL I QUALIFICATION FLOWCHART



# EARTHWORK INSPECTION LEVEL II QUALIFICATION FLOWCHART



## **Attachment 5-31**

### **EARTHWORK LEVEL I TRAINING COURSE**

Topics covered in this course include:

- (1) FM 1-T 238 Density of Soils and Bituminous Concrete Mixtures in Place by the Nuclear Method
- (2) FM 5-507 Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester
- (3) FM 5-504 Reporting Test Results on the Density Data Forms, Sampling Soils, Limerock, Cemented Coquina, Bank Run Shell, and Stabilizing Materials from the Roadway
- (4) Nuclear gauge maintenance.

## **Attachment 5-42**

### **EARTHWORK LEVEL II TRAINING COURSE**

Topics covered in this course include but are not limited to:

- (1) Density theory-
- (2) Density Data Forms-
- (3) Standard Specifications and Design Standards-

## **Attachment 5-53**

### **CTQP Qualification by Job Function**

#### **Earthwork**

##### **Earthwork - Level I:**

This is the QC Technician who must be qualified to perform acceptance tests such as Nuclear Density Tests, Speedy Moisture, sampling soils and reporting results in the. Earthwork Record Systems.

Any person who tests earthwork to verify material quality, resolves disputes or performs Independent Assurance (IA) must also possess this qualification.

##### **Earthwork - Level II:**

This is the QC Technician, private lab or contractor employee who must be qualified to perform acceptance tests (if Level I qualified), has knowledge of Density Theory, preparation, completion, Certification of the Earthwork Record Systems, Florida Specifications and Design Standards. This individual will also perform base acceptance tests and inspection.

Any person who verifies earthwork specification compliance of material quality or performs Independent Assurance (IA) must also possess this qualification.